

ADDENDUM No. 1

ITB No. 4467

Barton Dam Hydroturbine: 10-Year Inspection and Overhaul DUE DATE: Tuesday, January 24, 2017 at 10:00 A.M. (local time)

The following changes, additions, and/or deletions shall be made to the Invitation to Bid for Barton Dam Hydroturbine: 10-Year Inspection and Overhaul, on which proposals will be received on/or before Tuesday, January 24, 2017 at 10:00 A.M.

The information contained herein shall take precedence over the original documents and all previous addenda (if any), and is appended thereto. **This Addendum includes 2 pages of text and 19 pages of attachments.**

Bidder is to acknowledge receipt of this Addendum No. 1, including all attachments in his/her Bid by so indicating on page ITB-1 of the Invitation to Bid Form. Bids submitted without acknowledgement of receipt of this addendum will be considered nonconforming.

The following forms provided within the ITB Document must be included in submitted bids at bid opening.

- City of Ann Arbor Prevailing Wage Declaration of Compliance
- City of Ann Arbor Living Wage Ordinance Declaration of Compliance
- Vendor Conflict of Interest Disclosure Form
- City of Ann Arbor Non-Discrimination Ordinance Declaration of Compliance

Bids that fail to provide these completed forms listed above upon bid opening will be rejected as non-responsive and will not be considered for award.

I. CORRECTIONS/ADDITIONS/DELETIONS

Changes to the Bid documents which are outlined below are referenced to a page or Section in which they appear conspicuously. The Bidder is to take note in its review of the documents and include these changes as they may affect work or details in other areas not specifically referenced here.

Section/Page(s)	Change
BF-2	Correct Allowance unit. Add Item 10 "Allowance for Procurement of Additional Parts by Contractor". NOTE: As part of the bid submittal, replace the original BF-2 page with the BF-2 page attached to this addendum.
01000-5	Correct Allowance unit. Add Method of Measurement and Payment for "Allowance for Procurement of Additional Parts by Contractor".
S-101	Revise demolition/reconstruction limits for wall as shown. Note additional field conditions.
M-101	Show additional area to receive paint – wheel pit upper mounting flange for turbine housing.

II. QUESTIONS AND ANSWERS

The following Questions have been received by the City. Responses are being provided in accordance with the terms of the ITB. Respondents are directed to take note in its review of the documents of the following questions and City responses as they affect work or details in other areas not specifically referenced here.

Question 1: Please include photos of the inside of the wheel pit.

Answer 1: Photos included in this addendum.

Question 2: Please include additional sections of the turbine and building.

Answer 2: Additional drawings of machinery (turbine overall section, nose cone, wicket assembly and gear box) and building included in this addendum. Note: Original building drawings depict the building as constructed in 1912. The turbine equipment was changed and the structure was modified in 1986.

Question 3: Section 15500 - Overhaul of Turbine Equipment, 3.3 Mechanical Repairs and Replacements, A,6. Wicket Blades; How many "1-inch diameter each" cavitation pits are there?

Answer 3: 4 pits, paid per unit each.

Question 4: We understand the Contractor provides the complete draft tube work platform. Please confirm.

Answer 4: The Contractor shall provide all scaffolds, platforms and means of access to the draft tube work.

Question 5: Can a drawing of the wicket gate servos be supplied?

Answer 5: Drawing included in this addendum.

Question 6: Section 09900 -Painting, 1.1 Description, C, Paint Applications. Is there more submerged metal expected to be painted beyond the turbine housing and wicket assembly?

Answer 6: No.

Question 7: Confirm that the complete disassembly of the turbine IS NOT included as part of the base bid. (The turbine shaft, runner, bulkhead, wicket operating mechanism)

Answer 7: Removing the turbine nose cone and inspecting link arms, and documenting wicket and runner clearances and bearing clearances ARE included in the Base Bid. Sections 15500.3.2.B.3, .4 and .5 indicate what is required as part of the Base Bid. Items pertaining to the Bid Alternate are in section 15500.3.6.

Question 8: What type of grout do you want to use for the "new grout fillet"?

Answer 8: Provide monolithic concrete per the specification, without midrange.

Question 9: We would like to submit an Irrevocable Letter of Credit in the amount of our bid in lieu of the Performance and Labor and Material Bond. Is this acceptable?

Answer 9: Pursuant to the ITB# Document the City will only accept the Surety Bonds required and outlined in Section 29 on Page GC-12.

Respondents are responsible for any conclusions that they may draw from the information contained in the Addendum.

ATTACHMENTS

8	Demobilization	1	LS	\$	\$
9	Allowance	1	Alwnc¹	\$ 50,000	\$ 50,000
10	Allowance for Procurement of Additional Parts by Contractor	1	Alwnc	\$ 30,000	\$ 30,000¹
TOTAL BASE BID					\$

Total Base Bid: _____ Dollars (\$_____)

(Amount shall be shown in both words and figures. In case of a discrepancy, the amount shown in words shall govern.)

BID ALTERNATES					
1	Concrete Repairs	1	LS	\$	\$
2	Additional Mechanical Repairs				
2a	Runner servo	1	LS	\$	\$
2b	Runner rebuild	1	LS	\$	\$
2c	Wicket rebuild	1	LS	\$	\$
TOTAL ALTERNATE BID					\$

Total Alternate Bid: _____ Dollars (\$_____)

(Amount shall be shown in both words and figures. In case of a discrepancy, the amount shown in words shall govern.)

1. Addendum #1 January 17, 2016

<u>ITEM IN PROPOSAL</u>	<u>METHOD OF MEASUREMENT</u>	<u>BASIS OF PAYMENT</u>
Startup, Testing, Commissioning	By the unit lump sum (LS)	Complete services as described in Specifications.
Demobilization	By the unit lump sum (LS)	Complete demobilization from jobsite.
Allowance	By the unit Allowance (Alwnc)¹	Only for items that are pre-approved by the OWNER, which fall outside of the BASE or selected ALTERNATE scope of work.
Allowance for Procurement of Additional Parts by Contractor	By the unit Allowance (Alwnc)	For procurement, shipment and storage of select parts that are identified as Owner-Furnished under Section 01010,1.1,C,7. The Contractor and OWNER will jointly determine which items from Section 01010,1.1,C,7 will be purchased by the CONTRACTOR and which items will be purchased by the OWNER. CONTRACTOR-purchased items will be paid out of this allowance. NOTE: Separate to this item, Contractor's based scope shall still include purchasing miscellaneous parts required under the Base Bid (e.g. 15500,1.1,D; 15500,3.1,I; 15500,3.1,J).¹

BID ITEM – ALTERNATES

Concrete Repairs	By the unit lump sum (LS)	Underpinning, demolition, reinforcing, concrete, forming, testing and curing and all related work.
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ADDITIONAL MECH. REPAIRS AND REPLACEMENTS

Runner Servo	By the unit lump sum (LS)	Complete work as specified.
Runner Rebuild	By the unit lump sum (LS)	Complete work as specified.
Wicket Rebuild	By the unit lump sum (LS)	Complete work as specified.

END OF SECTION

1. Addendum #1 January 17, 2017

BARTON DAM HYDROTURBINE – 10-YEAR INSPECTION AND OVERHAUL



Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
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Legend

DATUM: ORIGINAL (NGVD29 ASSUMED)

NOTES:

1. CONTRACTOR SHALL PROTECT FLOOR @ 777.0 BY COVERING WITH PLANKING OR PLYWOOD AND SHALL TAKE SPECIAL PRECAUTIONS TO PREVENT ANY DEBRIS FROM ENTERING THE WICKET ASSEMBLY INCLUDING COMPLETELY COVERING THE WICKET OPENING WITH PLASTIC AND PLYWOOD.
2. EXACT DEMOLITION LIMITS TO BE FIELD DETERMINED BY ENGINEER.
3. GENERATOR, SUPPORT AND SPEED INCREASER MUST BE REMOVED BEFORE COMMENCING DEMOLITION. REFER TO DRAWING NO. M-101.
4. ALL EDGES SHALL BE SAWCUT 3" MIN. FROM OUTSIDE FACE.
5. ALL SAWCUT LINES SHALL BE AT RIGHT ANGLES, PARALLEL AND PERPENDICULAR.
6. ALL CONCRETE DUST SHALL BE CONTAINED AND PREVENTED FROM ENTERING THE RIVER OR MACHINERY.
7. REFER TO S-401 AND S-402 FOR PHASING OF WORK.

E	ADDENDUM #1			17.01.12
D	FINAL REVIEW			16.12.16
C	OWNER REVIEW			16.12.12
B	REVISION			16.12.12
A	PRELIMINARY			16.11.18

Issued _____ By _____ Appd. YY.MM.DD

File Name: 139801S-101.DWG MRH _____
Dwn. Chkd. Dsgn. YY.MM.DD

Permit-Seal

Client/Project
CITY OF ANN ARBOR

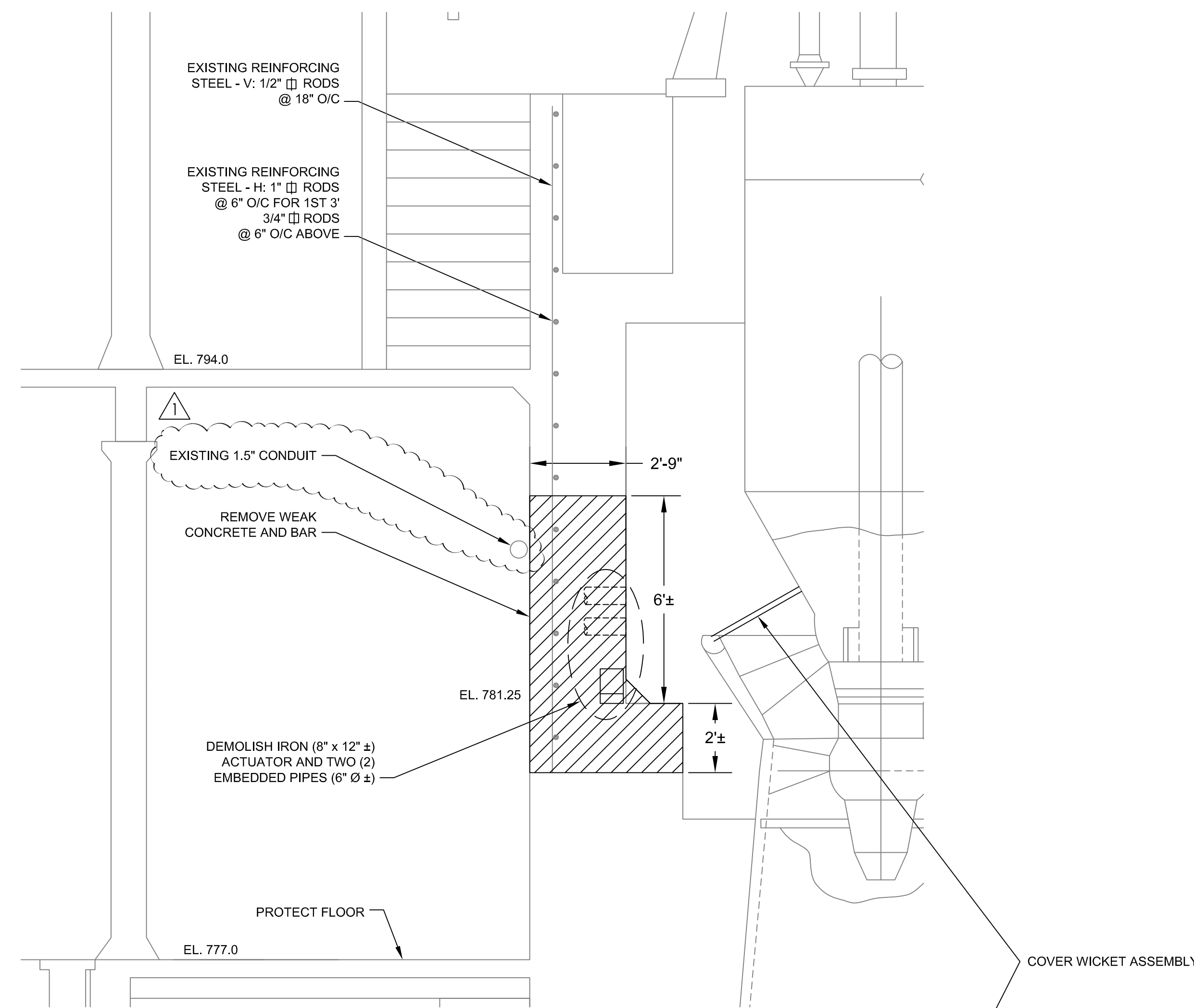
BARTON DAM HYDROTURBINE
10-YEAR INSEPECTION & OVERHAUL
Ann Arbor, Michigan

Title
DEMOLITION PLAN AND SECTION

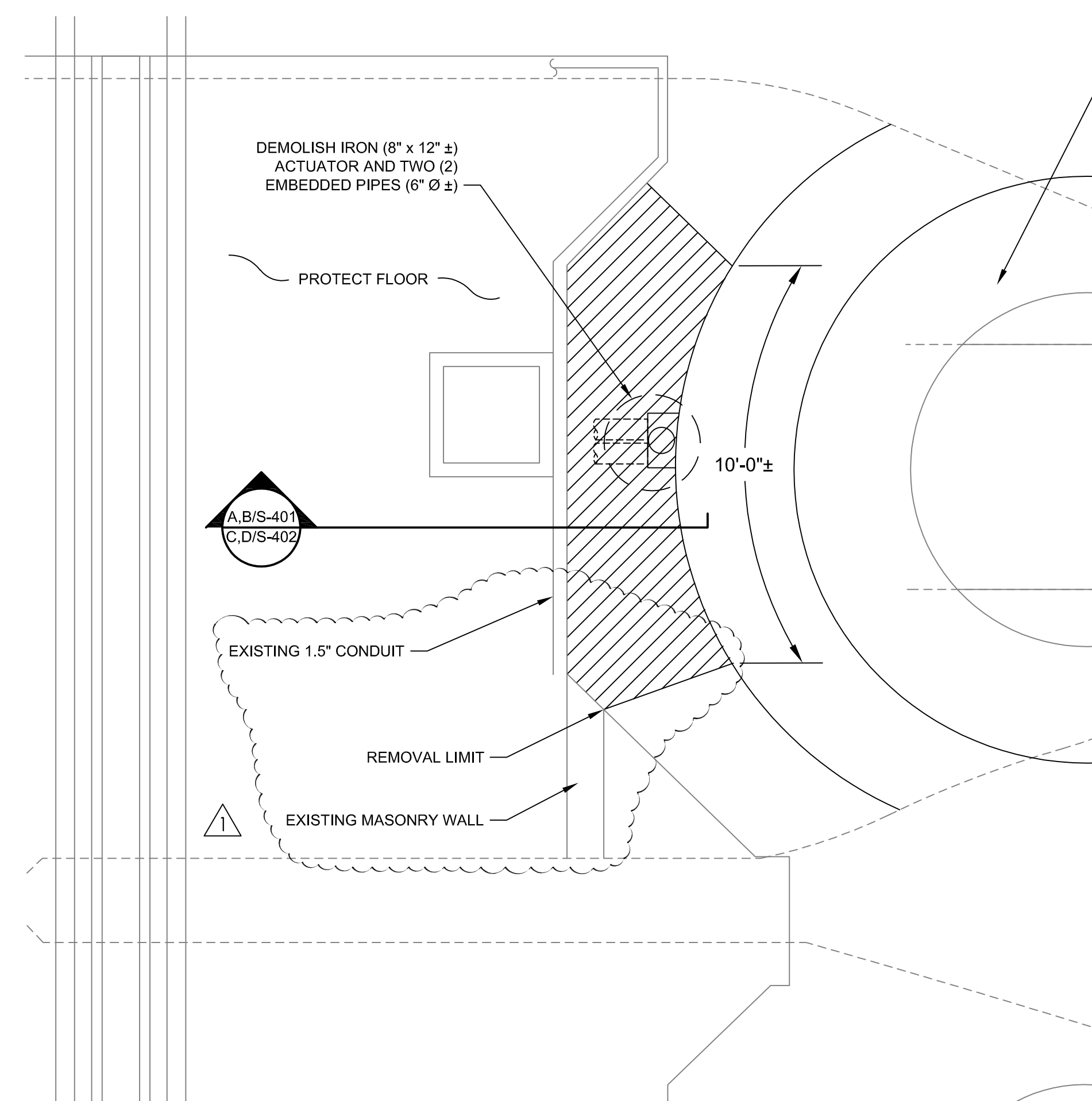
Project No. 2075139801
Drawing No. _____

Scale 0 2' 4' 6'
Sheet _____ of 7
Revision 0

S-101 4 of 7 0



SECTION VIEW



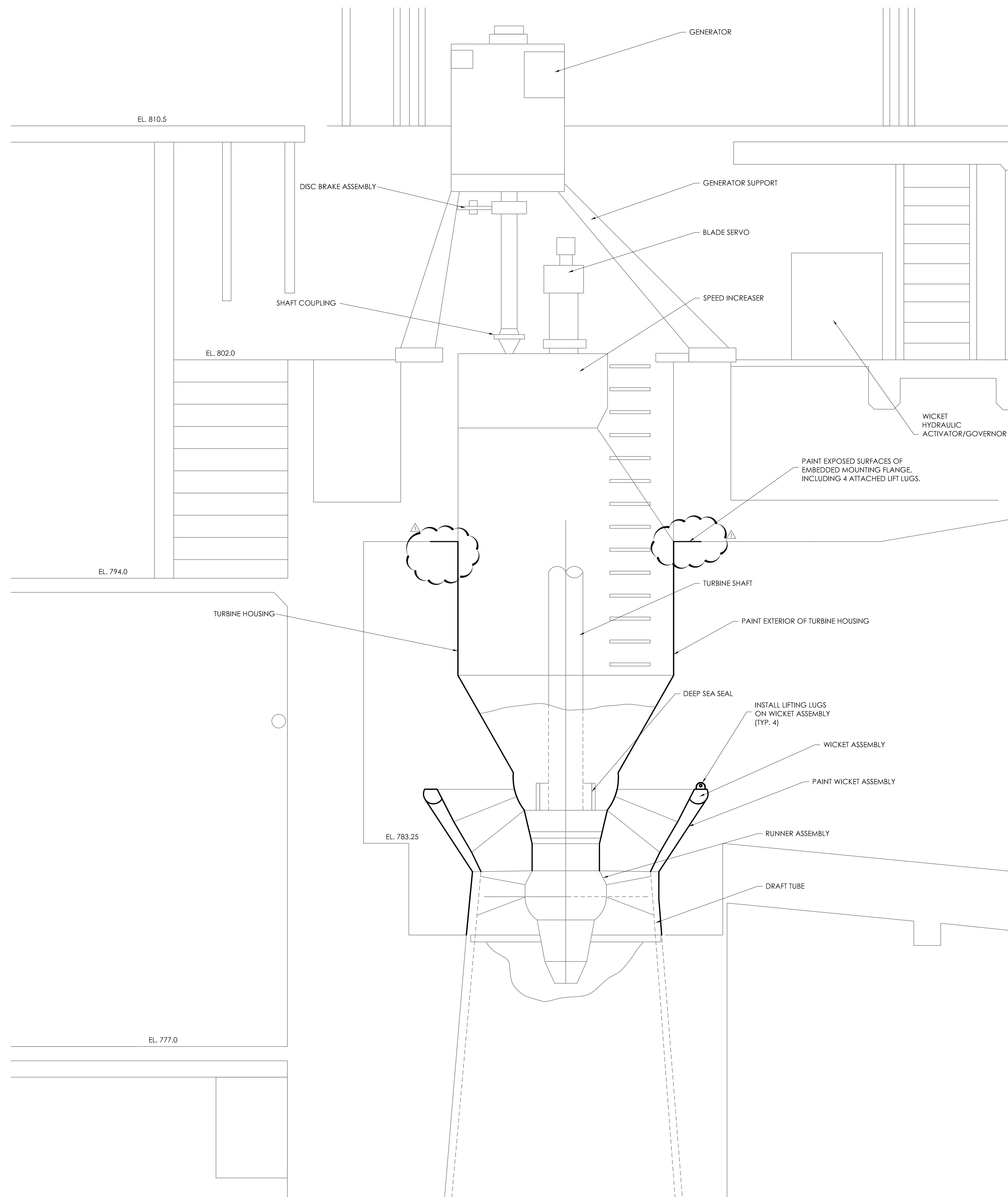
PLAN VIEW

811
Know what's below.
Call before you dig.

NOTE:
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING MISS DIG PRIOR TO CONSTRUCTION.

NOTE:

- SEE SPECIFICATIONS FOR FULL WORK REQUIREMENTS.



E	ADDENDUM #1			17.01.12
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Issued By Appd. YY.MM.DD

File Name:	139801M-101.DWG	MRH		
		Dwn.	Chkd.	Dsgn.
				YY.MM.DD

Permit-Seal

Client/Project
CITY OF ANN ARBOR

BARTON DAM HYDROTURBINE
10-YEAR INSEPECTION & OVERHAUL
Ann Arbor, Michigan


Title

PROPOSED WORK SECTION

Project No. 2075139801

Drawing No. Sheet Revision

M-101 7 of 7 0



811
Know what's below.
Call before you dig.

NOTE:
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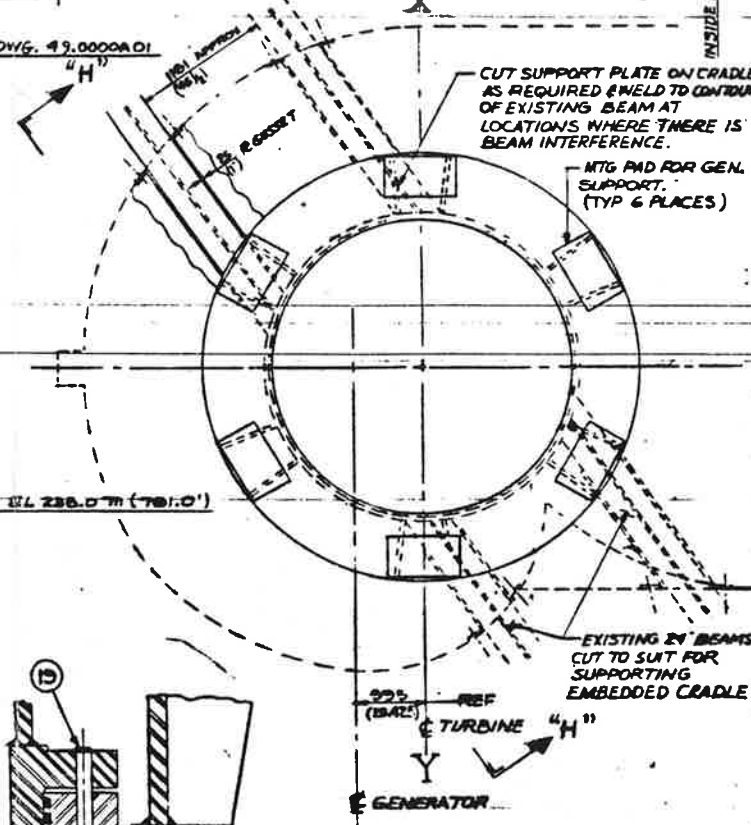
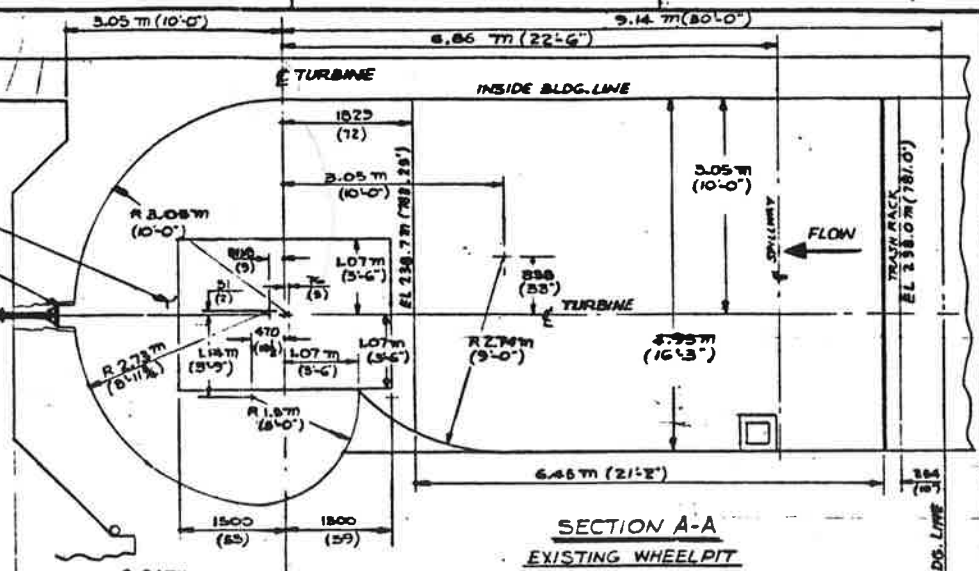
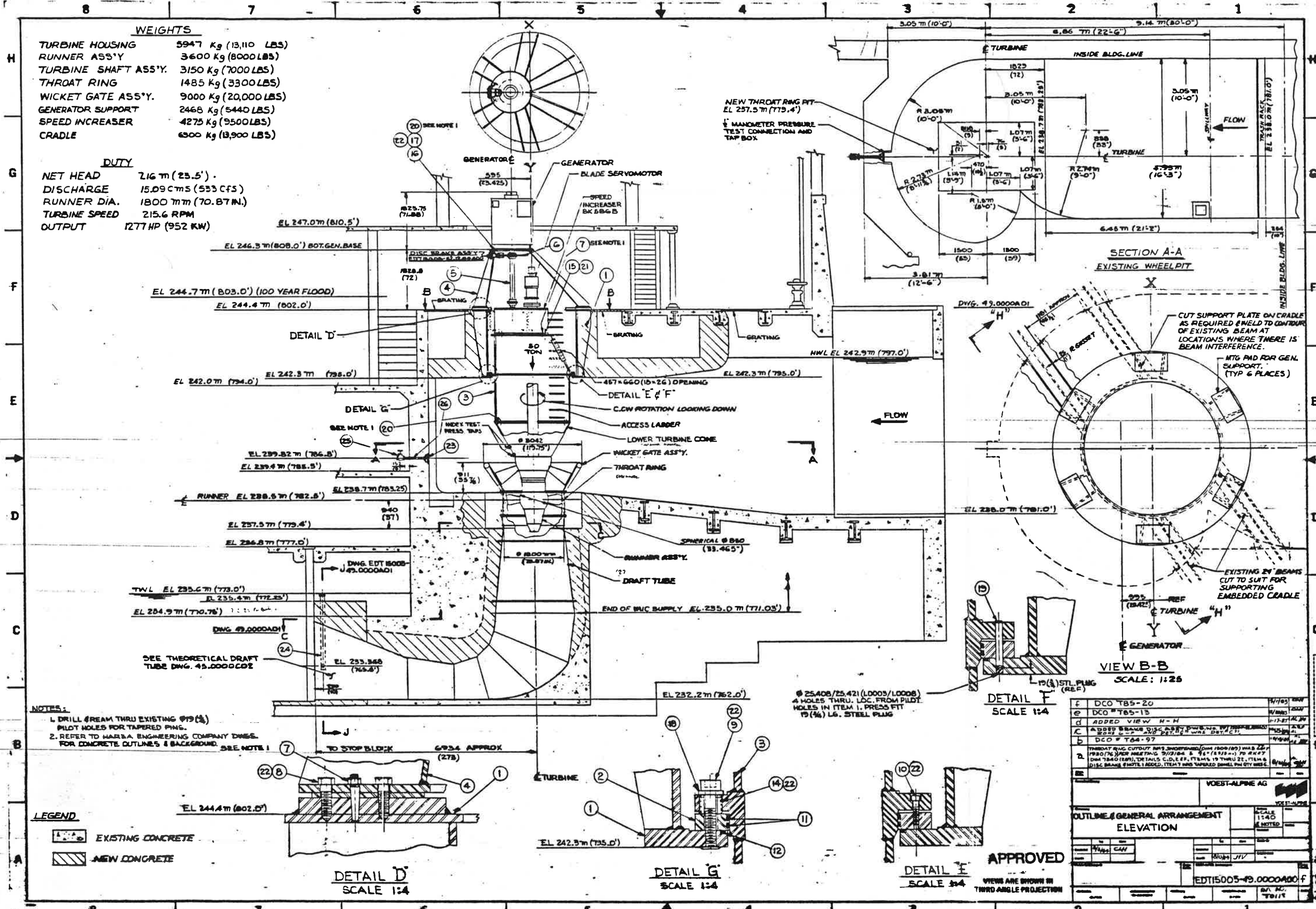


WEIGHTS

TURBINE HOUSING	5947 Kg (13,110 LBS)
RUNNER ASS'Y	3600 Kg (8000 LBS)
TURBINE SHAFT ASS'Y.	3150 Kg (7000 LBS)
THROAT RING	1485 Kg (3300 LBS)
WICKET GATE ASS'Y.	9000 Kg (20,000 LBS)
GENERATOR SUPPORT	2468 Kg (5440 LBS)
SPEED INCREASER	4275 Kg (9500 LBS)
CRADLE	6300 Kg (13,900 LBS)

DUTY

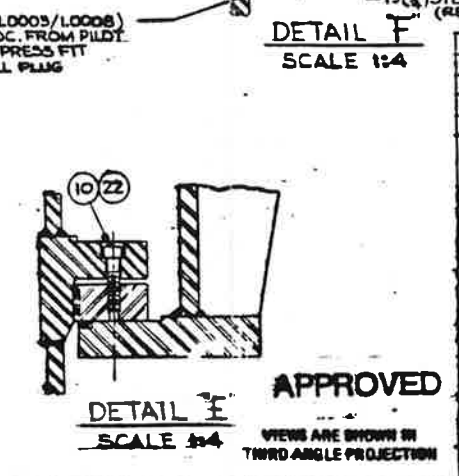
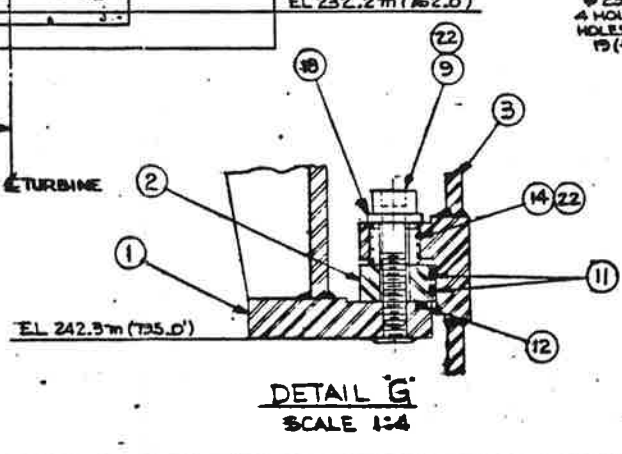
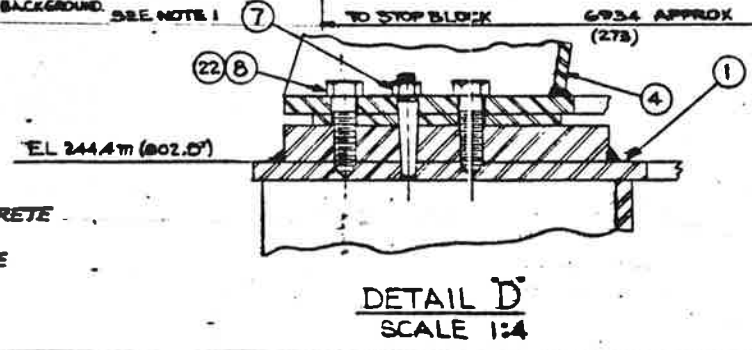
NET HEAD	216 m (708.5')
DISCHARGE	15.09 cms (533 cfs)
RUNNER DIA.	1800 mm (70.87 in.)
TURBINE SPEED	215.6 RPM
OUTPUT	1277 HP (952 KW)



- NOTES:**
1. DRILL & REAM THRU EXISTING Ø19 (¾) PILOT HOLES FOR TAPERED PING.
 2. REFER TO HARBA ENGINEERING COMPANY DWGS. FOR CONCRETE OUTLINES & BACKGROUND. SEE NOTE 1.

LEGEND

	EXISTING CONCRETE
	NEW CONCRETE



F	DCO T85-20	4/75	REV
e	DCO T85-13	11/82	ADD
d	ADDED VIEW H-H	11-82	ALW
c	ADDED BEARING DISCREPANCY DWG. NO. 4710000000	11-82	ALW
b	DCO T84-97	11/82	ALW
a	THROAT RING CUTOUT WAS SHOWN ON DWG. 1500100000 WAS 227 (180) (76) PER MEETING 9/13/84 & 9/15 (818) TO REV DWG 7840 (289), DETAILS C.D., E.P., ITEMS 19 THRU 22, ITEM 8 DISC BEAM PHOTO 1 ADDED. ITEM 1 WAS TAPERED SMALL PHOT. WERE.	11/82	ALW
REV			
VOEST-ALPINE AG			
VOEST-ALPINE			
OUTLINE & GENERAL ARRANGEMENT		SCALE	1:40
ELEVATION		E NOTED	
BY	CHK	DATE	APP
EDT15005-49.0000000 F			

APPROVED

VIEW ARE SHOWN IN THIRD ANGLE PROJECTION



VOEST-ALPINE INTERNATIONAL CORP.
Collingswood, N. J.
Finished Products Division

BILL OF MATERIAL

NO. EBT15005-49.0000D00

REV. c

PROJECT NAME: BARTON DAM
CONTRACT NO: _____
PROJECT NO: 15005
TYPE _____ NO. OF UNITS: 1

APPROVED

ASSEMBLY NO. _____
OUTLINE & GENERAL ARRANGEMENT EDT15005-49.0000A00

REV. d

ITEM	DCO NO.	QTY PER UNIT	DESCRIPTION	DRAWING NO.	REV.	MATERIAL	QA	ASME CODE	SPECIFICATION	REV.	REMARKS
1		1	LINER WELDMENT (CRADLE)	EDT15005-49.0021A00	a	ASTM A36	B		EFT0000-40.0307E EST0000-40.0101E		EMBEDDED PART BY VA
2		1	SEAL RING	EDT15005-41.0022C00	0	ASTM A36	A				SUPPLIED BY VA
3		1	TURBINE HSG. WELDMENT	EDT15005-41.0021A00	a	ASTM A36	A				SUPPLIED BY VA
4		1	SUPPORT, GENERATOR	EDT15005-49.0022A00	0	ASTM A36	B				SUPPLIED BY VA
5	T85-5	1	FLOATING SHAFT CPLG				B				PHILA. GEAR CORP, DWG. NO. 03020-0061
6	T85-5	1	BRAKE DISC	EDT15005-49.0024D00		AISI 1045	B				
7		10	TAPERED DOWEL PIN-THREADED	#12 x 4 1/2 LG		STEEL	C				
8		24	HEX. HD CAP SCR	1/4-7 NC x 3 1/2 LG		STEEL	C				
9		18	SOC HD. CAP SCR	1/4-7 NC x 7"		STEEL Y.P. 155,000	C				
10		12	SOC HD CAP SCR	5/8-11 NC x 3 LG		STEEL Y.P. 170,000	C				
11		2	"O" RING 3/8 DIA x 25'-0" LG.			BUNA N DURO 60	C				CUT TO SUIT "O" RING GROOVES IN ITEM 2 SCARF ENDS & BOND USING ITEM 13
12		1	"O" RING 3/8 DIA x 26'-0" LG.			BUNA N DURO 60	C				CUT TO SUIT "O" RING GROOVE IN ITEM 1 SCARF ENDS & BOND USING ITEM 13
13		AS REQ	ADHESIVE				C				FOR BONDING SCARFED ENDS OF ITEMS 11 & 12
14		18	BUSHING	EDT15005-41.0023D00	a	CDS #151 C1018	C				

Ⓐ

Prepared By: CH 9/4/84 Reviewed By: AL 9/20/84 Approved By: JPK/Li 9/25/84

DR. NO. T0118 Sheet: 1 of 2

DCO NO.	Rev.	DCO NO.	Rev.
15005 T85-20	B	T84-105	1/15/84
		T85-5	a
		T85-49	C

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VOEST-ALPINE INTERNATIONAL CORP.

Collingswood, N. J.

Finished Products Division

BILL OF
MATERIAL

NO. EBT15005-49.0000D00

REV. C

PROJECT NAME: BARTON DAM

CONTRACT NO: _____

PROJECT NO: 15005TYPE _____ NO. OF UNITS: 1

APPROVED

ASSEMBLY
OUTLINE & GENERAL
ARRANGEMENTASSEMBLY NO.
EDT15005-49.0000A00REV d

ITEM	DCO NO.	QTY PER UNIT	DESCRIPTION	DRAWING NO.	REV.	MATERIAL	QA	ASME CODE	SPECIFICATION	REV.	REMARKS
-15		6	HEX HD CAP SCR	1 3/4-5 UNC X 6 LG		STL, SAE GRADE 5	C				
-16		8	HEX HD CAP SCR	1/4-7 UNC X 4 LG		STL, SAE GRADE 5	C				
-17		8	HEAVY HEX NUT	1/4-7 UNC		STL ASTM A194 CL 2H	C				
-18		18	WASHER-FLAT	5/16 I.D. X 3/8 O.D. X 5/32 THK		STEEL	C				
-19		4	PULL OUT DOWEL PIN	EDT 15005 - 49.0025D00		STN, STL, TYPE 303 ACC'Y STOCK	C				
-20		8	TAPERED DOWEL PIN	#12 X 3" LG		STL	C				
-21		6	HEAVY HEX NUT	1 3/4-5 UNC		STL, ASTM A194 CL 2H	C				
-22		1	LOCTITE			CAT. NO. 242-31	C				1.69 FL. OZ. (50cc)
-23	T85-20	1	PRESSURE TAPPING ASS'Y. FOR INDEX TEST	EDT 15005 - 49.0023C00		STN, STL, TYPE 304					
-24	T85-20 T85-40	2	CABLE STUFFING BOX	EDT 15005 - 49.0026D00		STEEL PIPE BRASS PIPE CAP					
-25	T85-20	1	BALL VALVE	1/2" NPT		BRASS					JENKINS 300#
-26	T85-20	1	SCH 40 PIPE 1/2" X 18" LG			TYPE 304 STN STL					

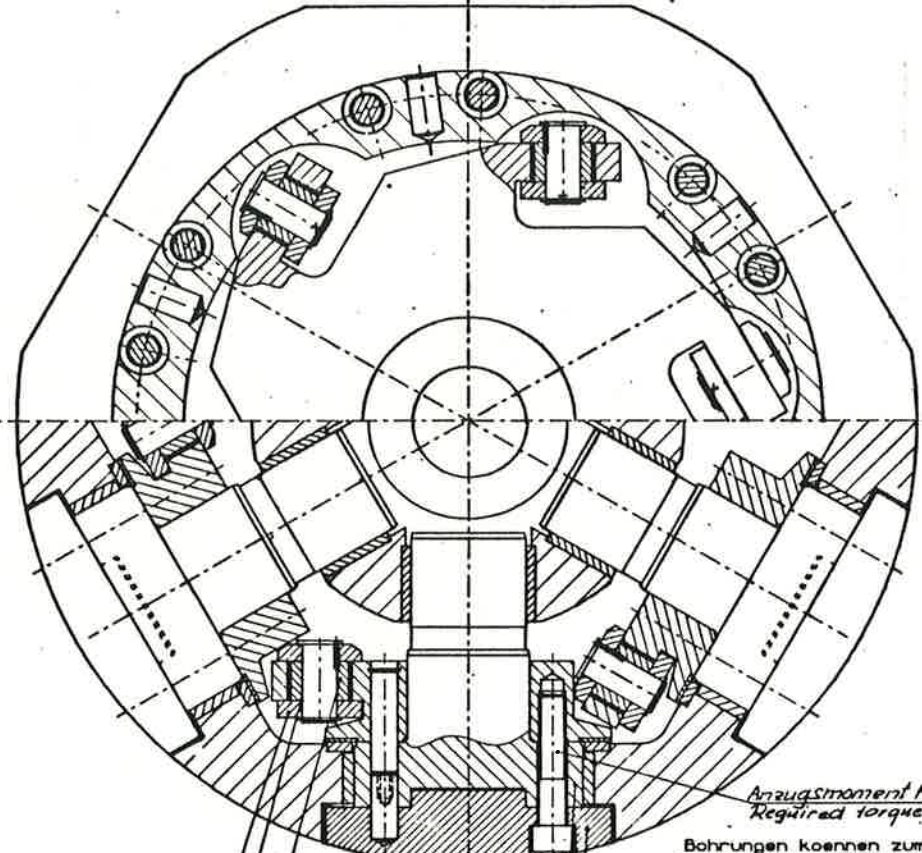
Prepared By: CH 9/4/84 Reviewed By: AL 9/20/84 Approved By: JP Verh7/25/84
4/2/85
8-10-85

DCO NO.	Rev.	DCO NO.	Rev.
T85-5	a		
T85-20	b		
T85-40	c		

DR. NO. T0118 Sheet: 2 of 2

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SCHNITT A-B



MBB-741.6032D
 M10x20 DIN 912/A2
 Rundschur Ø8 x 1550lg
 Rundschur Ø8 x 1200lg
 O-ring
 Teilrüge bei OM mit
 Loctite abdichten
 Loctite gap at site

Anziehdrehmoment
 MA=780Nm
 Required torque per
 locking screw MA=780Nm
 (Ringfeder Locking Assemblies
 RFN 7012 see page 12)
 Installation and removal
 instructions)

MBB-741.6029E
 M10x30 DIN 912/A2
 Secure with Loctite

Stift durch Schweiß-
 punkt sichern
 secure bolt by
 welding point

MBB-741.6022B
 Ø20m8x50 DIN 7 LC13/10
 M24x50 DIN 912-10.9
 Anziehdrehmoment MA=750Nm
 Required torque

MBB-741.6027D
 30x90 DIN1/LC13/10

MBB-650.1925D
 30x90 DIN1/LC13/10

MBB-650.1735E
 M16x75 DIN931/A2

Secure screw with Loctite

Sk-Mutter
 M8x3
 DIN934-LC13/10

329 Obere Endstellung der Regelstange (Offenstellung)
 (Upper final position of regulating rod (4,952"))

16MM x 70MM STAINLESS
 BOLTS (4)

Spannschraube M40 DIN484
 bei Mont. gem. bohren
 bolt should be drilled at site

MBB-741.6036-
 Blech 75x50x10 St380C
 bei OM anschweißen
 (Safety plate to be welded at site)

M16 x140lg DIN 933
 ATTENTION!
 Remove before starting
 (for balance and transport)
 WICHTIG!
 Vor Inbetriebnahme entfernen
 (zum Wuchten u. f. Transport)

Stift durch
 Schweißpunkt
 sichern
 secure bolt by
 welding point

MBB-741.6034E
 6x10 DIN 1481

MBB-741.6024C
 Zyl. Lager
 Ø55xØ80x36lg
 Fiberglide
 25x12 DIN 492

MBB-741.6023B
 Zyl. Lager
 Ø55xØ80x36lg
 Fiberglide

Buchse buendig in
 Nabe einpressen
 (bushing press in
 flushing with hub)

MBB-741.6028E
 Rotomatic Dichtung
 Ø180xØ 205x16
 Fa Merkel

MBB-741.6021C
 Zyl. Lager
 Ø210xØ230x54lg
 Ø180xØ200x70lg
 Ø105xØ115x63lg

Fiberglide
 M5x10 DIN551 mit Loctite sichern
 Spannsatz Ringfeder
 Ø300xØ455
 RFN 7012

Anziehdrehmoment MA=750Nm
 Required torque
 Bohrungen koennen zum
 Ausgleich der Unwucht
 mit Blei gefuellt werden
 to compensate unbalance
 holes may be filled with lead

MBB-741.6026D

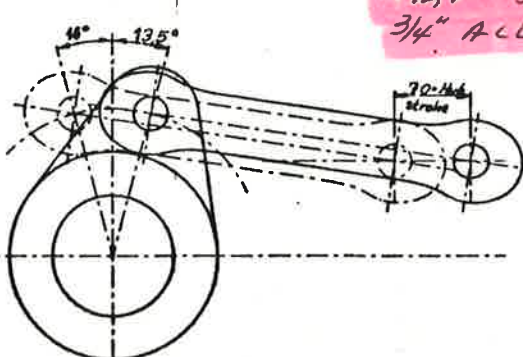
MBB-741.6031E
 5x28 DIN1481
 32x1.5 DIN 471

MBB-741.6033C
 M24x120 DIN912-10.9
 25m6 x 30 DIN 7
 25m6 x 30 DIN 7379

(MBB-741.6001B)

MBB-741.6030E

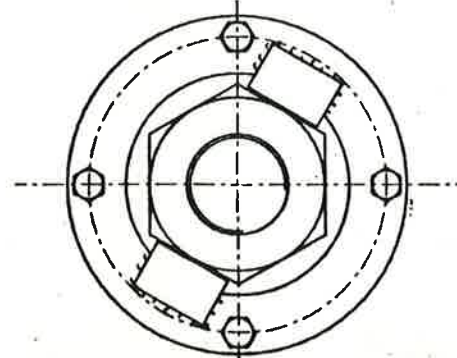
SCHNITT C-C



CAP SCREWS
 M24 3.0 PITCH
 3/4" ALLEN

LINKSLÄUFEND
 COUNTER-CLOCKWISE

Ansicht X



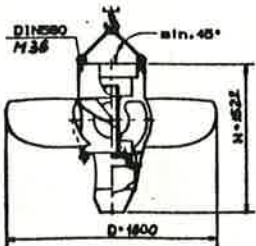
Laufadgewicht mit Fluegel: 2950kg
 (weight: runner with blades)

komplett montiert mit
 Laufadfluegel wuchten:
 Betriebsdrehzahl n=216U/min
 Durchgangsdrehzahl n_c=570U/min
 Dynamisch wuchten
 Auswuchtguetetestufe Q=6,3

Balance together with runner
 blade (completely assembled)
 Operating speed n=216U/min
 Runawayspeed n_c=570U/min
 Balance dynamically
 Balancing Quality Grade Q=6.3

Bei OM mit Devcon St auskitten
 fill with Devcon St at site installation

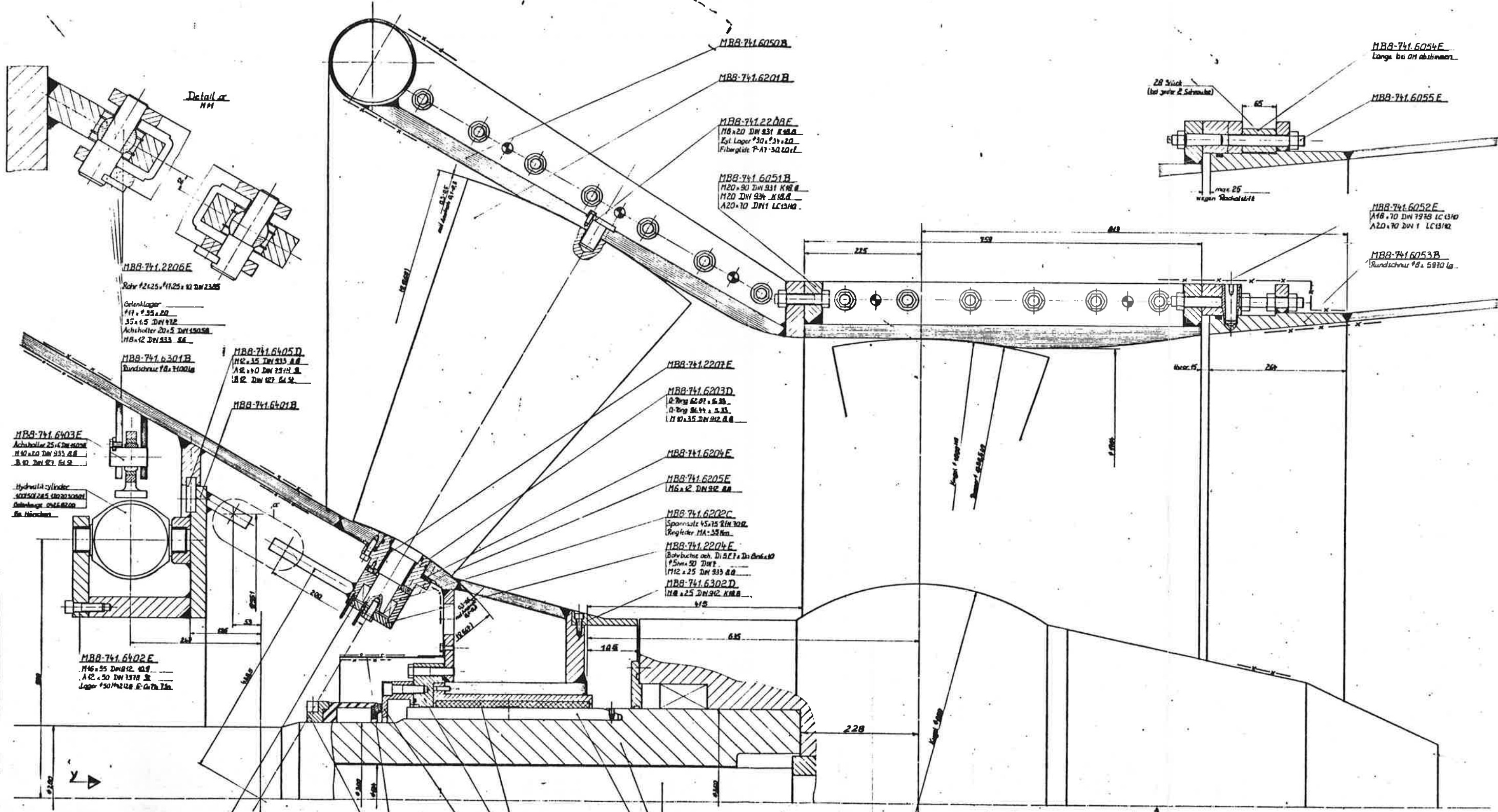
TRANSPORTSKIZZE
 unmaszstablich



Laufad Innen u. Aussen wasserberuehrt
 Anstrich lt. Stueckliste-MBB-602.1007-
 Nichtrostende Teile ohne Anstrich

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BARTON-DAM		TLM14	
Turbinenschnitt (Laufad) (runner)			
Date: 04.10.2011		Scale: 1:1	
Drawing No: MBB-602.1100 BA		Sheet No: 5	



Detail α
H 11

MBB-741.2206E

Rohr 12x25 x 1125 x 12 DN 2308
Ortenlager
H11 x 235 x 20
35 x 45 DN 1412
Achshalter 20 x 5 DN 15058
H16 x 12 DN 933 86

MBB-741.6301B

Rundschnur 18 x 110018

MBB-741.6405D

M12 x 35 DN 933 86
A12 x 50 DN 1513 8
A12 DN 127 64 9

MBB-741.6401B

MBB-741.6403E

Achshalter 25 x 4 DN 5008
M10 x 20 DN 933 86
A12 DN 97 64 9

Hydraul. Zylinder
100 x 50 x 285 100 x 50 x 285
Anbauhöhe 100 x 50 x 285
Ba. H100 x 50

MBB-741.6402E

M16 x 35 DN 812 109
A12 x 50 DN 1513 8
Lager 150 x 42 128 6-6 1/2 130

MBB-741.6050B

MBB-741.6201B

MBB-741.2208E
M16 x 20 DN 931 K 18.8
Kyl. Lager 10 x 21 x 20
Fibergleit P-A1-30.10 L

MBB-741.6051B
M20 x 30 DN 931 K 18.8
M20 DN 934 K 18.8
A20 x 10 DN 1 LC 13/12

MBB-741.2207E

MBB-741.6203D
12-70 x 62 07 x 5.33
0-70 x 96.44 x 5.33
M10 x 35 DN 912 86

MBB-741.6204E

MBB-741.6205E
M16 x 12 DN 932 86

MBB-741.6202C

Spannsatz 45 x 15 21 x 30 R.
Ringfeder MA: 25 Nm

MBB-741.2204E

Bohrbocksch. Di 527 x 21 016 x 10
150 x 30 DN 7
M12 x 25 DN 933 86

MBB-741.6302D

M18 x 25 DN 932 K 18.8
1/5

MBB-741.6104D

M16 x 30 DN 933 86

MBB-741.6107D

M16 x 20 DN 933 K 18.8

MBB-741.6105D

M16 x 30 DN 931 K 18.8
Rundschnur 15 x 1230
Rundschnur 15 x 1480

MBB-741.6106D

M16 x 60 17 902 K 18.8

MBB-741.6103B

MBB-741.6101B

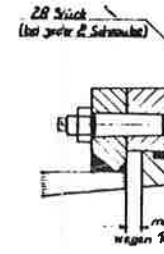
MBB-741.6102C

M10 x 12 DN 551 mit Lactik sichern
Bohrung bei Werkmontage fertig

MBB-741.6054E

Longe bei DN abstimmen

MBB-741.6055E



MBB-741.6052E

A16 x 10 DN 1798 LC 13/12
A20 x 10 DN 1 LC 13/12

MBB-741.6053B

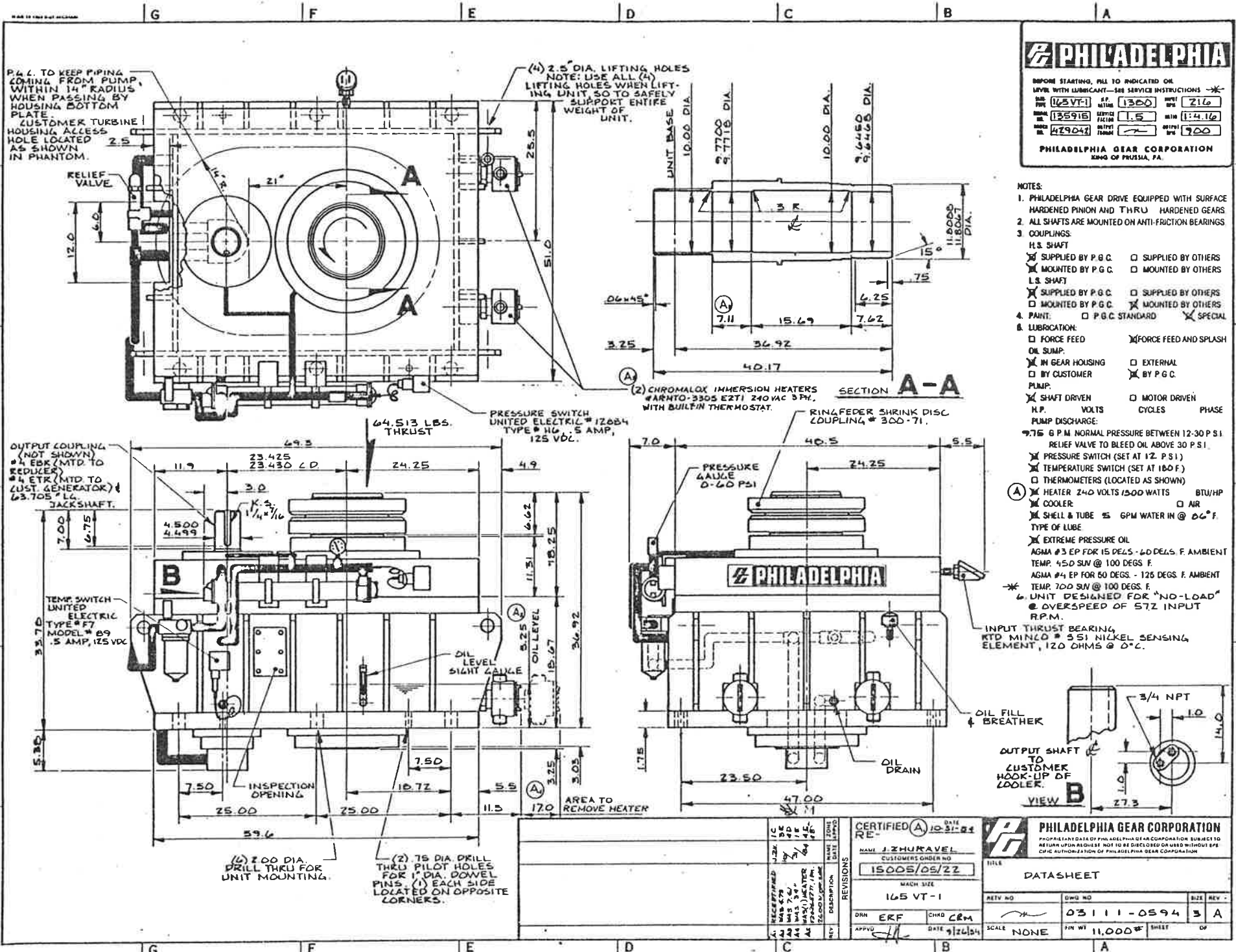
Rundschnur 18 x 5910 la.

Nach Montage des Leitapparates mit Servomotor in Offenstellung setzen und die Zuordnung des Hebels zur Leiterschleife mit Bohrschablone kontrollieren (16x2 Bohrungen)! Bei späterem Verdrehen einer Leiterschleife Federlenker aushängen u. mittels Deckel u. 2 Stiften Zuordnung wieder herstellen.
After installation of wicket gate mechanism set servomotor in open position and mark relation of lever to wicket gate using bore template (16x2 bore 15mm). Remove cover! In case of later twisting of a wicket gate, take all gate link with safety spring and restore position using cover and 2 pins.

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VOLVO-ALFA ROMEO AG

BREMSEINRICHTUNG PROTECTION AGAINST CORROSION		STUHL MITTEN IN REIHE VON MATERIALIEN	
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	100

KW Barton Dam		TLM 4	
Turbinenschnitt			
Architekt: ABB-AG			
M 1:25		1:25	
MBB-6024100			



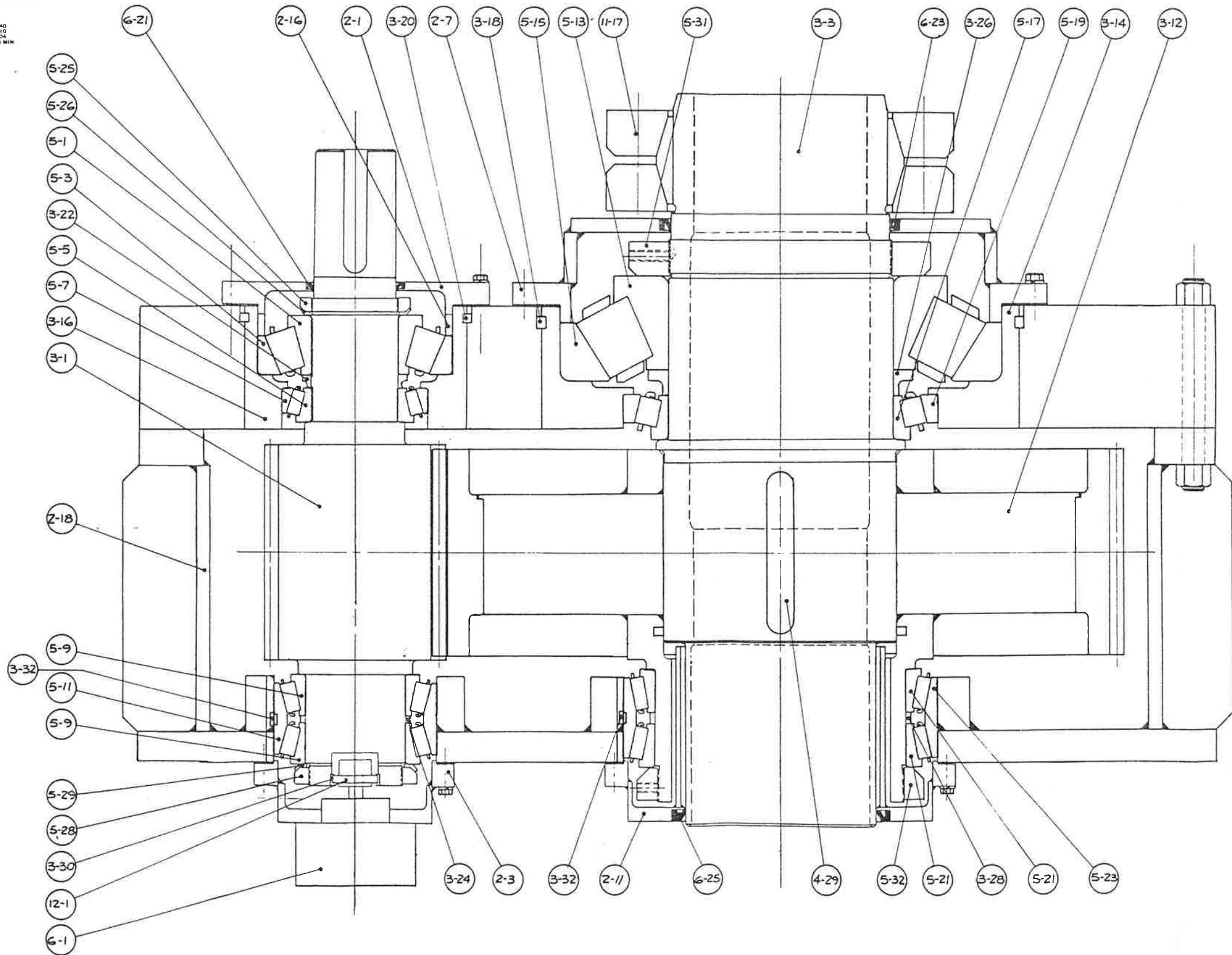
PHILADELPHIA GEAR CORPORATION PHILADELPHIA, PA.	
TITLE DATASHEET	
REV. NO. 03111-0594	DWG. NO. 03111-0594
SIZE 3 A	SHEET 3 A
SCALE NONE	FIN. WT. 11,000#

RECEIVED MAR 29 1972 MAR 30 1972 MAR 31 1972 APR 1 1972	REVISIONS DATE DESCRIPTION
CERTIFIED NAME J. ZURAVEL CUSTOMER ORDER NO. 15005/05/22	DATE 10-31-72
MACH. SIZE 165 VT-1	DATE 9/26/54

ORIGINAL DWG. NO.

M | L | K | J | H | G | F | E | D | C | B | A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES. REMOVE
ALL BURRS & SHARP CORNERS
TURN FILLETS .030 UNDER FINISH
GRIND DIMENSIONS. POLISH FILLETS
TOLERANCE LIMITS UNLESS OTHERWISE
SPECIFIED
UNMACH ANGLES 1:1
MACH DIM: .0004
XX .0008
XXX .0015
ANGULAR: .0004
E 10 MIN



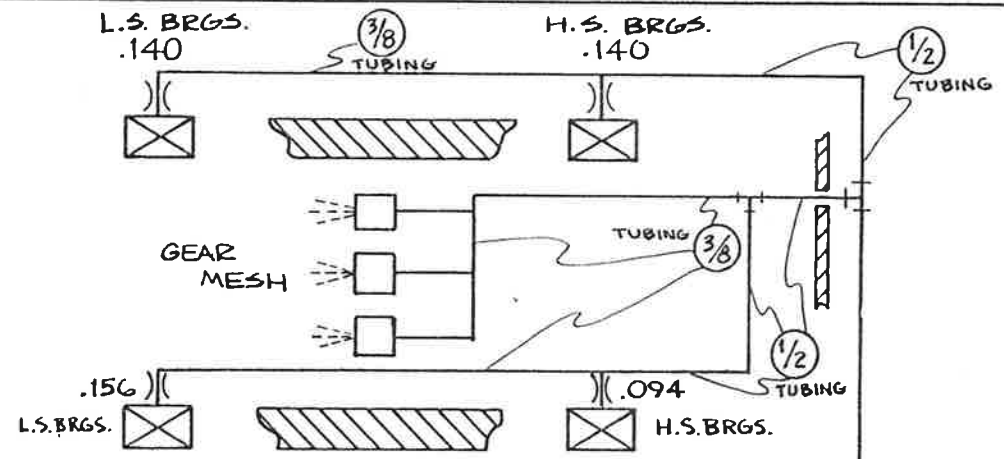
ITEM NO.	QTY	NAME	MATERIAL	PART NO.
2-1	1	H.S. THRU CAP	STEEL	50040-4789
2-3	1	H.S. PUMP CAP	STEEL	50020-0998
2-7	1	L.S. THRU CAP	STEEL	50040-4792
2-11	1	L.S. THRU CAP	STEEL	50040-4791
2-16	1	H.S. SPACER	STEEL	50015-0388
2-18	1	HOUSING	STEEL	50200-1715
3-1	1	H.S. PINION # SFT.	STEEL	50365-2543
3-3	1	L.S. SHAFT	STEEL	50485-0412
3-12	1	L.S. GEAR	STEEL	50105-6500
3-14	1	L.S. BRG. CART.	STEEL	50045-1847
3-16	1	H.S. BRG. CART.	STEEL	50045-1845
3-18	1	L.S. SPLIT RING	STEEL	50308-0349
3-20	1	H.S. SPLIT RING	STEEL	50308-0347
3-22	1	H.S. BRG. SPACER	STEEL	50315-7598
3-24	1	H.S. BRG. SPACER	STEEL	50315-0738
3-26	1	L.S. BRG. SPACER	STEEL	50315-7600
3-28	1	L.S. BRG. SPACER	STEEL	50315-2676
3-30	1	COUPLING RING	STEEL	46067-9049
3-32	2	BEARING PIN	STEEL	50215-0960
4-27	1	BREATHER	PLASTIC	
4-29	1	KEY	STEEL	
5-1	1	BEARING CONE	TIMKEN	
5-3	1	BEARING CUP	"	
5-5	1	BEARING CONE	"	
5-7	1	BEARING CUP	"	
5-9	2	BEARING CONE	"	
5-11	1	BEARING CUP	"	
5-13	1	BEARING CONE	"	
5-15	1	BEARING CUP	"	
5-17	1	BEARING CONE	"	
5-19	1	BEARING CUP	"	
5-21	2	BEARING CONE	"	
5-23	1	BEARING CUP	"	
5-25	1	LOCKNUT	STEEL	
5-26	1	LOCKWASHER	STEEL	
5-28	1	LOCKNUT	STEEL	
5-29	1	LOCKWASHER	STEEL	
5-31	1	LOCKNUT	STEEL	
5-32	1	LOCKNUT	STEEL	
6-1	1	OIL PUMP	TUTHILL	
6-3	1	OIL COOLER	ANER STD.	
6-13	1	OIL FILTER	CAN-FLO	
6-15	1	RELIEF VALVE	FUL-FLO	
6-17	1	HEATER	CHROMAL	
6-21	1	OIL SEAL H.S.	C/R	
6-23	1	OIL SEAL L.S.	C/R	
6-25	1	OIL SEAL L.S.	C/R	
6-29	1	SUPPORT PLATE	STEEL	50215-0178
11-17	1	SHRINK DISK CPLG.	RINGFEDER	
12-1	1	COUPLING HUB	STEEL	46068-5655

* NOT SHOWN

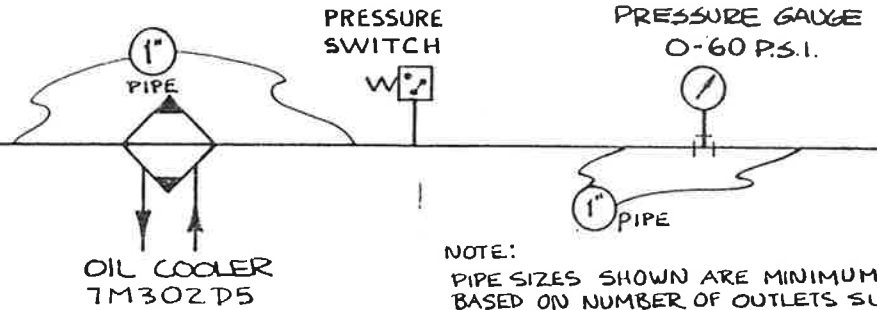
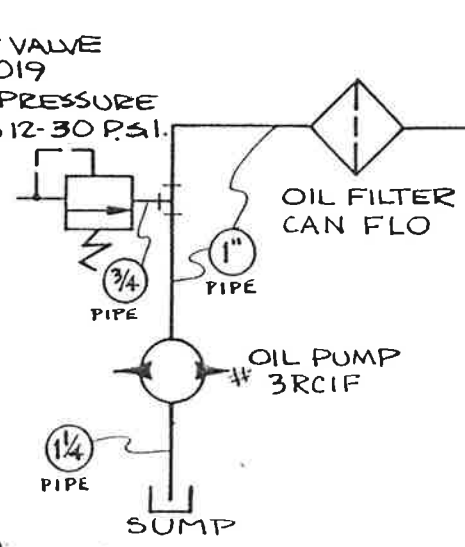
REVIEWED BY:		OLD DWG NO.	PHILADELPHIA GEAR CORPORATION	
DEPT.	INITIALS	DATE	1ST ORDER NO.	429042
MATERIAL		HEAT TREAT	SUBJECT TO PHILADELPHIA GEAR CORPORATION'S POLICY	
MACH SIZE		SCALE	USED WITHOUT SPECIFIC AUTHORIZATION OF PHILADELPHIA GEAR CORPORATION	
TITLE		PARTS LIST		
REV. NO.		DWG. NO.	SIZE	REV.
1		165 VT-1	0.125	4
DATE		DATE	SHEET	
2-13-85		2-13-85	OF	

ORIGINAL DWG NO.

- ⌋(- ORIFICE (SEE DWG.)
- ☐ - SPRAY NOZZLE 1/8U-8010 (1)REQ'D.
- * NORMAL PRESSURE BETWEEN 12-30 P.S.I. RELIEF VALVE TO BLEED OIL ABOVE 30 P.S.I.



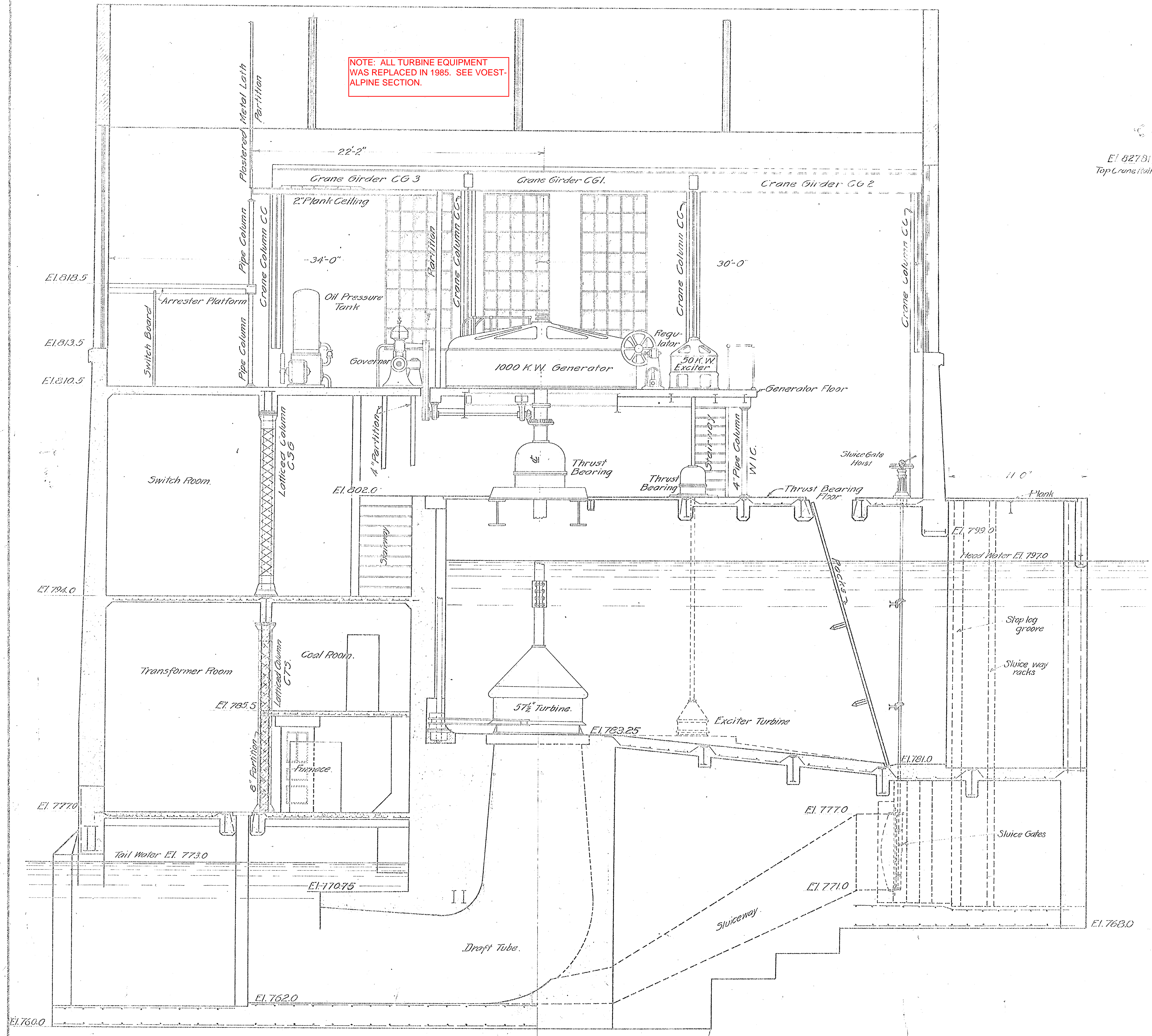
RELIEF VALVE SVJ-2019
 * SET PRESSURE BETWEEN 12-30 P.S.I.



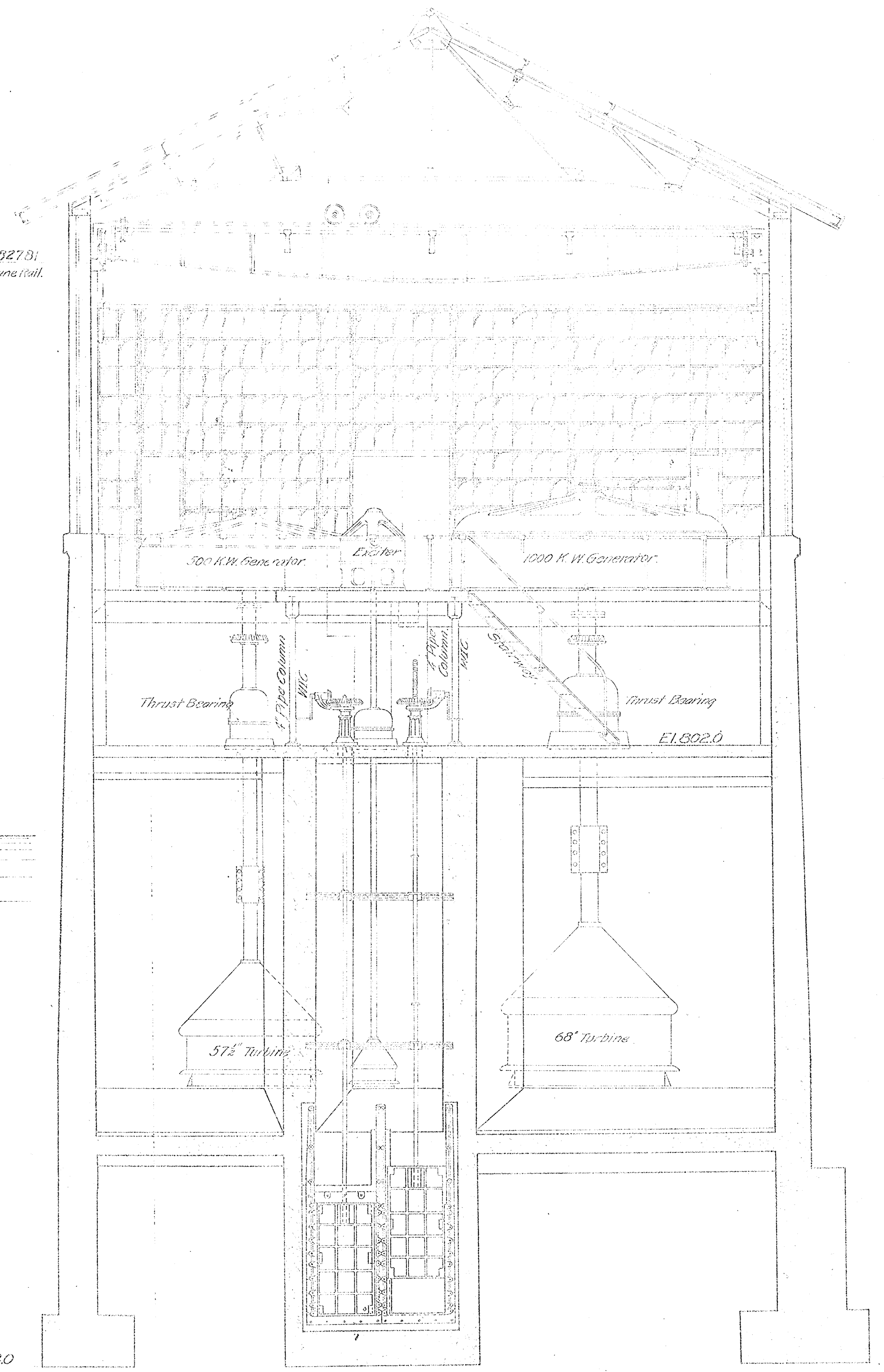
NOTE: PIPE SIZES SHOWN ARE MINIMUM BASED ON NUMBER OF OUTLETS SUPPLIED.

REVISIONS	Q/D DWG NO	PHILADELPHIA GEAR CORPORATION	
	1ST ORDER NO - 429042	PHILADELPHIA GEAR CORPORATION SUBJECT TO RETURN UPON REQUEST NOT TO BE DISCLOSED OR USED WITHOUT SPECIFIC AUTHORIZATION OF PHILADELPHIA GEAR CORPORATION	
REV DESCRIPTION	MATL	LUBE SCHEMATIC	
	HEAT TREAT	REV NO	DWG
	MACH SIZE	07111-0196	REV
	165 VT-1	2	
	DRN	SCALE	SHEET OF
	APPVT	DATE 9-25-84	

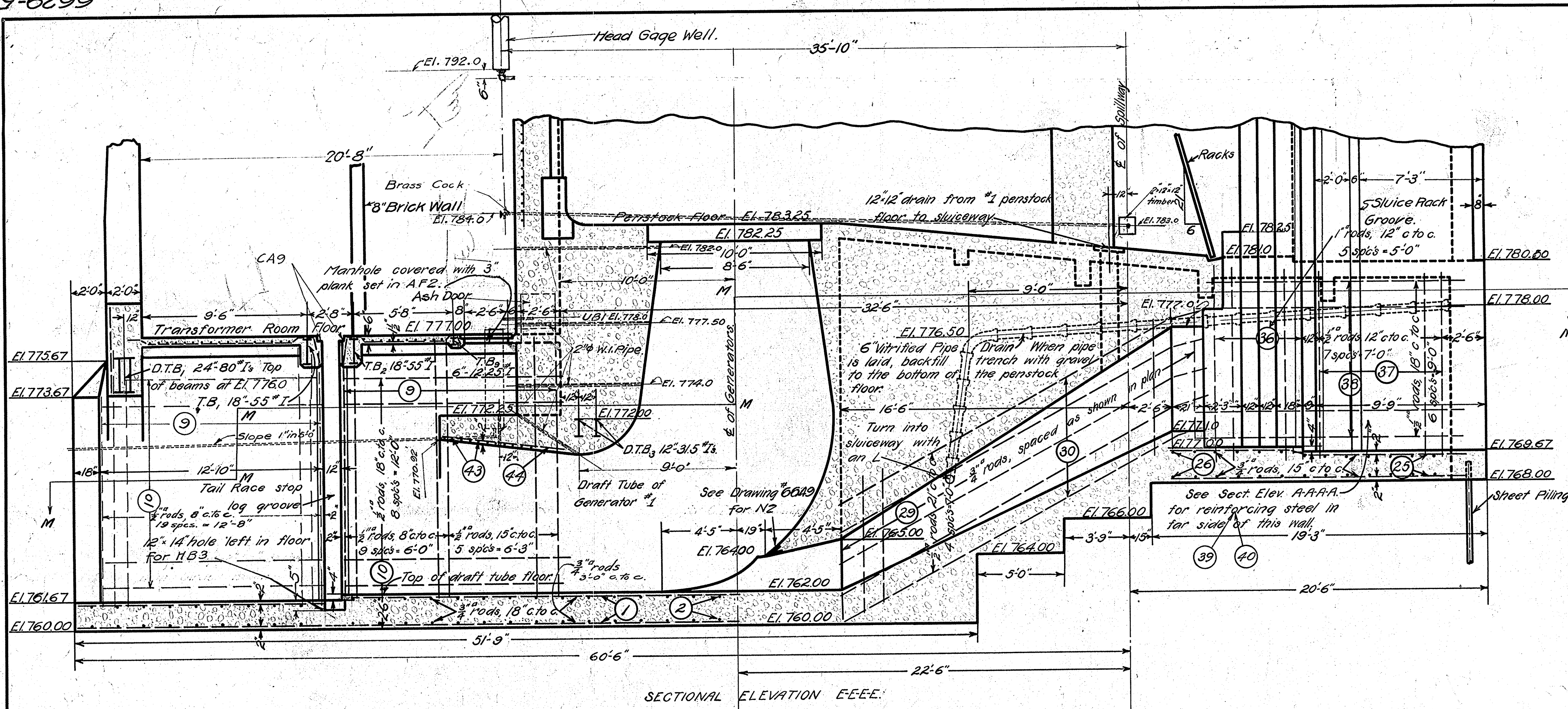
NOTE: ALL TURBINE EQUIPMENT WAS REPLACED IN 1985. SEE VOEST-ALPINE SECTION.



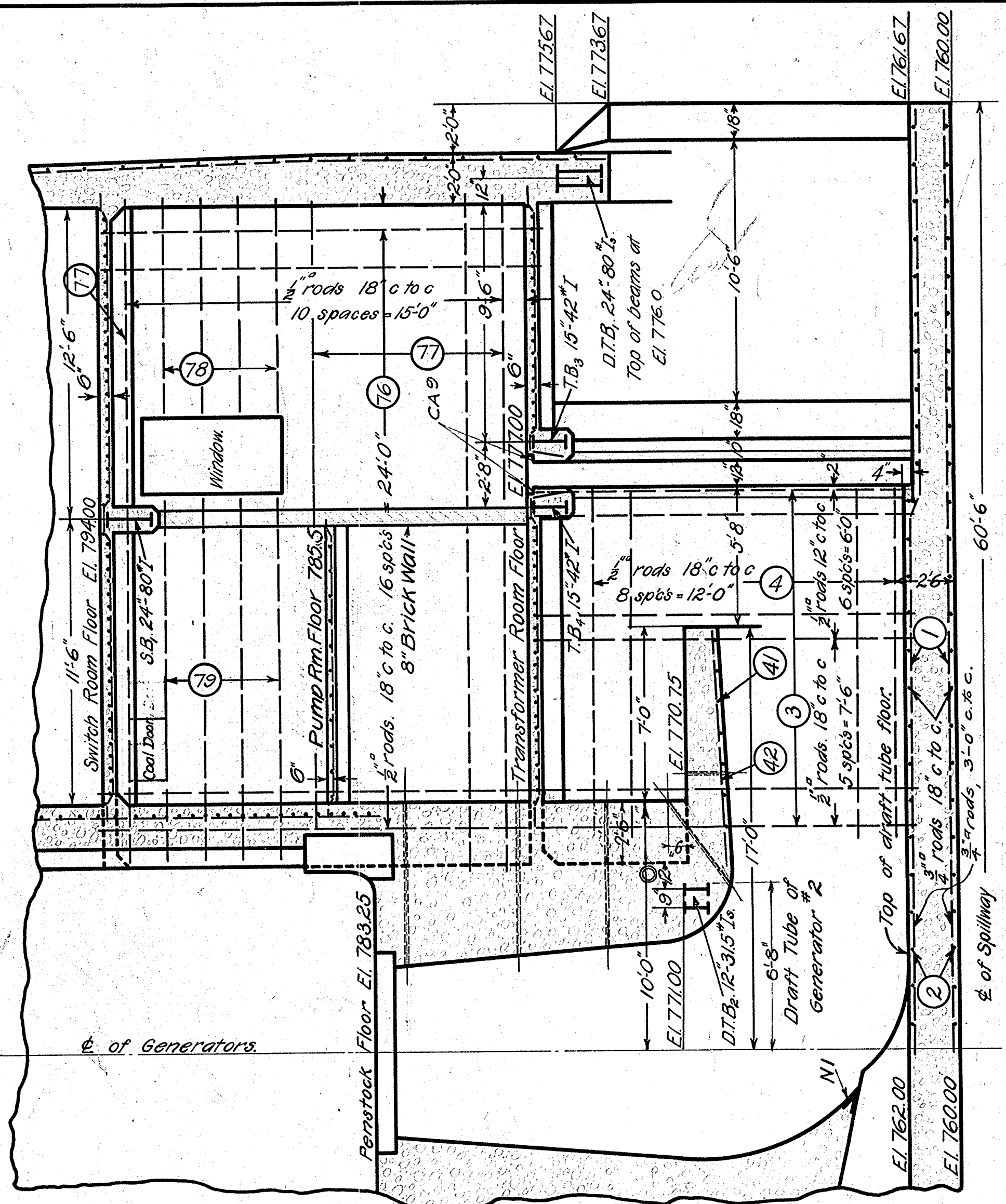
El. 827.81
Top Crane Rail.



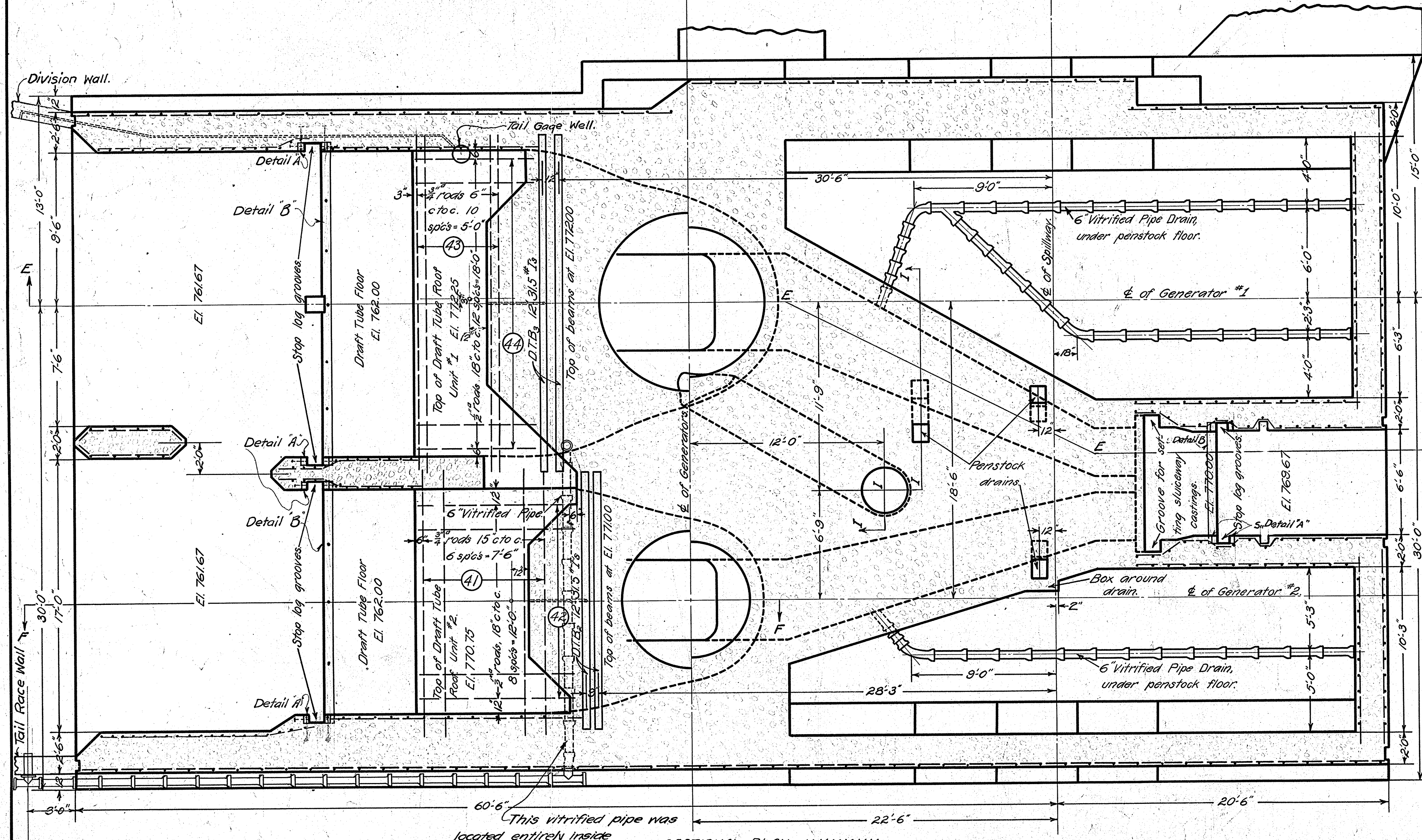
EASTERN MICHIGAN EDISON COMPANY
BARTON POWER PLANT
 GENERAL SECTIONS
 GARIBOLDI S. WILLIAMS, CONSULTING ENGINEER,
 ANN ARBOR, MICHIGAN.
 1912-8-12
 Scale 1/4"=1'



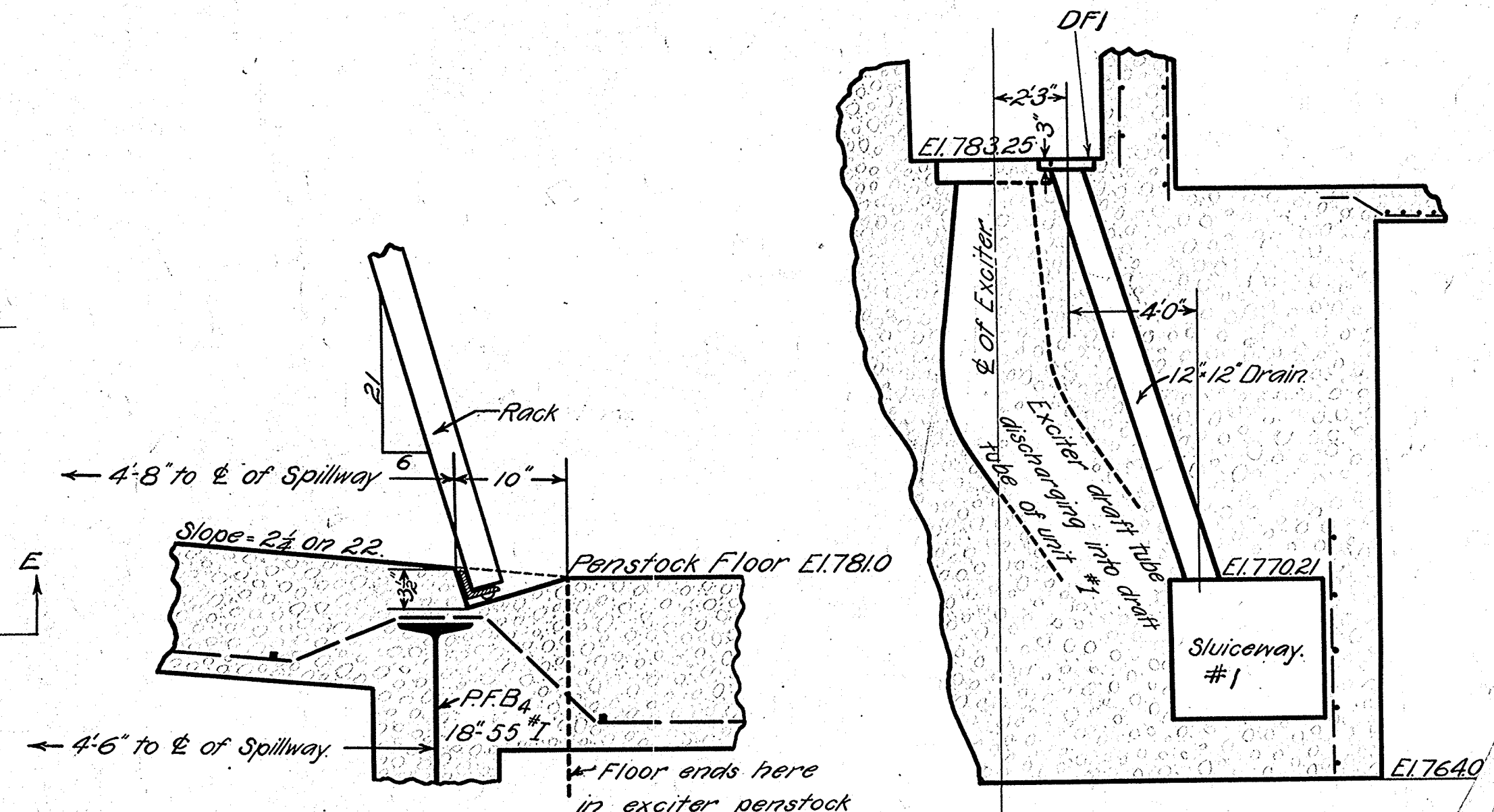
SECTIONAL ELEVATION E-E-E



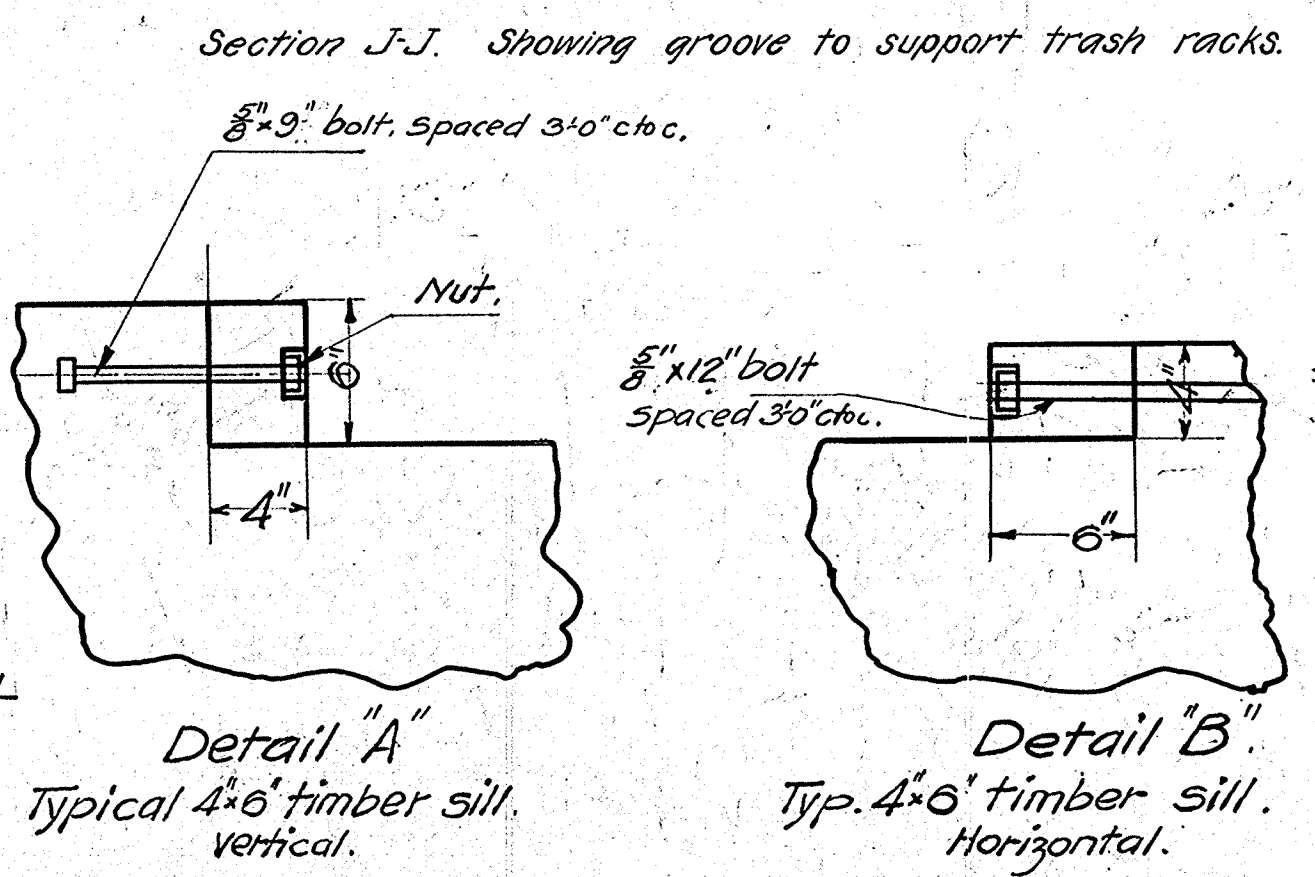
SECTIONAL ELEVATION F-F



SECTIONAL PLAN. M-M-M-M-M-M-M



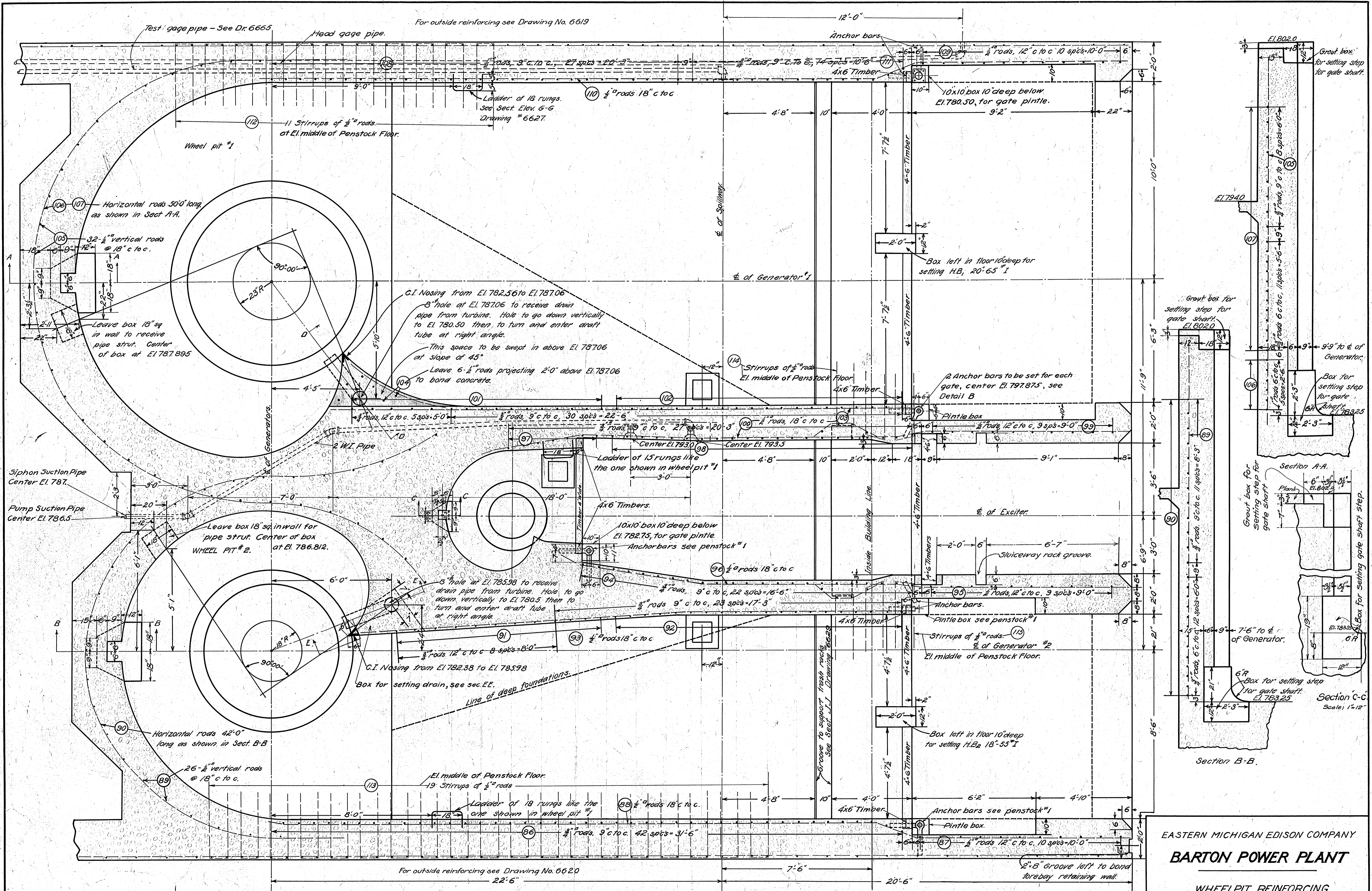
SECTIONAL ELEVATION I-I-I



Detail "A" Typical 4x6 timber sill, vertical.

Detail "B" Typ. 4x6 timber sill, Horizontal.

EASTERN MICHIGAN ED
BARTON POW
 SUBSTRUCT
 GARDNER S WILLIAMS
 ANN ARBOR
 1912-7-2
 Sca



SECTIONAL PLAN OF WHEELPITS

Note: Secs. DD and EE on Sheet 6616

Center El. 797.875
Detail B
Gate Bonnet Anchor Bars.

EASTERN MICHIGAN EDISON COMPANY
BARTON POWER PLANT
WHEELPIT REINFORCING
GARDNER S. WILLIAMS, CONSULTING ENGINEER
ANN ARBOR, MICHIGAN
1912-4-8
Scale 1/2"=1'

Section B-B
Section C-C
Scale 1/2"=1'

END OF ADDENDUM